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A NEW GENUS OF SCARABAEIDAE WITH DESCRIPTIONS AND NOTES ON PHYLLOPHAGA*

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This paper includes an interesting new genus of Scarabaeidae from Texas, a new Phyllophaga from Texas, and two new Phyllophaga from Alabama. The new Alabama species now bring the total Phyllophaga for the state to 60 species and varieties. In addition to the new descriptions in this paper, notes are given on other little known species of Phyllophaga.

Benedictia new genus

Antenae 10-segmented, the insertion visible from above. Posterior margin of clypeus sharply declivous, the front margin with two long triangular perpendicular projections. Mandibles not visible from above. Labrum free, transverse, highly sclerotized. Pronotum glabrous, except at extreme posterior margin, margined and with the front margin, especially at middle, membranous. Elytra glabrous, strongly narrowed behind. Pygidium free, without spiracle. Abdominal sternites seven, free, and most of them nearly equal. Penultimate dorsal and ventral abdominal segments not connate. Abdominal spiracles slightly dirvergent, located on ventral abdominal segments and near lateral membranes. Prosternum produced anteriorly and carinate before the front coxae. Front coxae conico-transverse. Front tibia 3-toothed and with an internal movable spur. Claws of all tarsi equal, 3-toothed. Hind and middle tibiae with two free spurs. Entire venter clothed with long whitish hairs.

Genotype: **Benedictia pilosa** n. sp.

This genus apparently should be referred to the Pleocominae by a number of characters, but appears to

* Research Paper No. 626 Journal Series, University of Arkansas.

be quite distinct from either of the genera of the United States included therein. The possession of ten segments in the antennae, the peculiar type of claws, and other characters would seem to exclude it from Pleocoma or Acoma. Superficially this beetle resembles some of our species of Amphicoma but among other things differs in the absence of a spiracle in the pygidium. If the abdomen is examined on the side in the male (female unknown), seven segments are clearly evident.

The genus is named after Mr. Warwick Benedict, Coleopterist at the University of Kansas. To Mr. Benedict, I am grateful for introducing me to the study of Coleoptera, and for his many kindnesses while we were working with the Snow Collection of beetles.

Benedictia pilosa n. sp

Length, 13-15 mm.; width 5.5-6 mm.

Body oblong-elongate, but very slightly depressed, deep reddish-brown above. Club of antenna 2 mm. in length, normally 5-segmented (but 4-segmented in the remaining club in type), longer than stem. Basal antennal segment rather suddenly swelling from base. Second segment narrower than first, slightly wider than long. Third narrower than second, the width and length subequal. Fourth slightly wider than long. Fifth prolonged into a short process. Sixth forming the first major lamella of club, and but slightly shorter than the seventh to the tenth which are equal. Apex of club slightly curved. Front between the eyes slightly convex and limited on the inside of each canthus by a prominent curved carina. Clypeus flat, transverse, nearly perpendicular to body and sharply declivous posteriorly. Two large conspicuous depressed areas behind the declivity. An inconspicuous raised, longitudinal ridge between the depressions. Depressions glabrous, moderately and irregularly punctured. Posterior margin of clypeus slightly produced. Sides in basal one-third nearly parallel, thence convergent anteriorly. Apex with two large perpendicular projections, each as long as its width at base and nearly separated from the other by its width at base. Surface of clypeus irregularly punctured. Pronotum transverse, about two-fifths wider than long. Widest at middle, convergent posteriorly, posterior angles broadly rounded. Margin of pronotum entire; anterior margin membranous at middle. Lateral margins with ir-

regular, long, coarse hairs. Posterior margin with a very conspicuous row of short, dense, white hairs. Disc rather irregularly and closely punctured in anterior half, the punctures here larger and occupying all of sides of pronotum to posterior rounded angles. Disc from about middle to base more finely punctured. Elytra widest at base, wider than pronotum, and rather suddenly narrowed behind the basal third leaving lateral margins of abdominal segments visible. Lateral margin conspicuous to a point some distance before apex. Elytral apices nearly separately rounded. Sutural costa distinct. Two or three discal costae faintly evident. Disc very finely, sparsely and irregularly punctured. Maxillary palpus 4-segmented, the terminal segment nearly four times longer than wide and approximately equal to the three preceding combined. Mentum elongate-oval. Fore tibia tridentate, the apical tooth longer than the two basal ones. First anterior tarsal segment equal in length to next three combined. Fifth segment nearly equal to length of first one. Claws on all tarsi equal, each with a small rounded basal swelling and three long straight, nearly equal teeth. Prosternum between the front coxae with a prominent hirsute process. Entire venter clothed with long, dense, whitish hairs, these hairs extending upon the sides of abdominal segments visible from above, also prominent between the elytral and pronotal bases. Hind femur about twice as long as wide, the tibia at apex nearly one-half as wide as its length. Seven visible abdominal segments in the male when examined from the side, the last retracted within the penultimate one. Pygidium about as long as wide, distinctly narrowed posteriorly. Pygidium also clothed with long, whitish hairs. For figures of the male genitalia, see Plate I, figures 11 and 12.

Holotype male, Presidio Co., Tex., July 16, 1927, R. H. Beamer; paratype males as follows: Presidio, Tex., Sept. 14, 1935, 1; Presidio, Tex., Sept. 2, 1938, and June 14, 1930, W. L. Owen, Jr., 2; Big Bend Park, Brewster Co., Tex., Sept. 5, 1937, Rollin H. Baker, 2. Holotype in the Francis Huntington Snow Collection, University of Kansas, one of the Brewster Co. paratypes in my collection, the other in the collection of O. L. Cartwright, Clemson College, South Carolina, and the three Presidio paratypes in the collection of Mr. Lawrence W. Saylor,

Washington, D. C. I am grateful to Mr. Cartwright for allowing me to retain one of his two specimens.

Phyllophaga lodingi n. sp.

Length, 18.5-23 mm.; width 9.5-11.5 mm.

This species belongs to the **fusca-rugosa** Group of Horn (Revision of the Species of Lachnosterna of America North of Mexico, Trans. Amer. Ent. Soc., XIV, 1887).

Form oblong, distinctly wider behind. Color from light brown to deep black. Dorsal surface shining, glabrous.

Antennae 10-segmented, the club fully equal to segments one to seven combined. Maxillary palpi distinctly impressed. Clypeus rather deeply emarginate with margin very slightly reflexed; surface flat, densely and confluently punctured. Front more coarsely punctured than clypeus but with distinct interspaces; clypeal suture distinctly impressed.

Pronotum very unevenly punctured, the punctures moderate and separated from one to many times their diameters. Punctures along base of pronotum between posterior angle and median lobe finer and confluent. A few of the punctures along the sides with minute hairs. Sides of pronotum at base parallel then slightly rounded at middle and straight to apex.

Elytra very finely and irregularly punctured. Sutural costa distinct from a point behind scutellum to apex; discal costa distinct, the one nearest the sutural costa considerably widened behind.

Pygidium convex, distinctly wider than long, finely and nearly regularly punctured; shining.

Abdomen very finely punctured and with a short hair arising from each puncture; the punctures more sparse toward the middle. Abdomen flattened at middle; penultimate segment with an oblique elevation on either side of middle and with the posterior two-thirds of segment depressed. Segment finely granulate in depression. Last abdominal segment broadly and shallowly excavated and nearly smooth at middle, rather coarsely punctured on each side of depression.

Fixed spur of hind tibia short, broad at base, and about one-half the length of free spur. The free spur

slightly shorter than first tarsal segment and distinctly widened at middle. Tooth of claw strong and median.

Metasternum rather finely punctured with a fine hair arising from each puncture.

Holotype male, Smither's Mountain, Madison Co., Ala., June, 1937. Allotype female, same data as holotype. Paratypes as follows: one female, same data as types; Monte Sano, Ala., VI-18-37, H. P. Loding, 2 males, 1 female; same locality, XI-32, 1 female; VII-1932, 4 males; June, 7 males, 3 females; Jackson, Ala., VI-21-1931, 2 males, 2 females; Tuscaloosa Co., Ala., VI-20-1933, 1 female; 1 male from Alabama but without definite locality.

The female has the club of antenna about equal to segments 2-7 combined. Abdomen very convex and extremely finely punctured at middle. Last abdominal segment unmodified.

This species shows a certain resemblance to **bipartita** (Horn) and **forsteri** (Burm.) but is easily separated by the characters of the male and female genitalia.

The species is named after Mr. H. P. Loding, the foremost authority on Alabama Coleoptera. He has allowed me to retain the types and some of the paratypes. Other paratypes have been returned to his collection.

For figures of the male and female genitalia, see Plate I, figures 7 to 10.

Phyllophaga jonesi n. sp.

Length, 21-22 mm.; width, 10.5 mm.

The present species possesses the general oblong shape of **ilicis** (Knoch) and is otherwise closely related to that species.

Body widest at middle of elytra. Color deep reddish-brown, distinctly pruinose and iridescent above. Color of head black, rather sharply contrasting with that of pronotum and elytra.

Antennae 10-segmented, the club nearly as long as the first seven segments; color reddish-brown, the club a little lighter than color of legs. Clypeus distinctly emarginate, very closely and occasionally confluently punctured. Front a little less closely punctured only near clypeal suture. A very tiny erect hair arising from each puncture on front.

Pronotum very closely and especially confluently punctured on sides, the punctures all transverse. A slender recumbent hair arising from each puncture. Sides of pronotum only with a few larger and stiffer hairs arising along the finely crenated margins. A smooth median line on basal two-thirds of pronotum. Sides of pronotum parallel in basal half.

Elytra extremely finely and regularly punctured with a very tiny whitish hair in each puncture. Sutural costa distinct, more convex near apex and nearly as broad near apex as at middle. Submarginal costa evident in apical one-half. Scutellum wider than long with numerous punctures along the sides, each puncture with a fine recumbent hair.

Pygidium rather strongly convex, transverse, the surface nearly regularly and finely punctured. Surface pruinose, nearly devoid of pubescence.

Abdomen narrowly flattened at middle, very finely punctured, except on the penultimate and last segments which have the punctures larger laterally. Penultimate segment with a rather sudden arcuate depression behind anterior one-third. Surface and front margin of depression very finely transversely rugulose. Ultimate segment slightly cupped at middle.

Fixed spur of hind tibia about as broad and two-thirds as long as free spur. Free spur about as long as first hind tarsal segment. Tooth of claw strong and median.

Metasternum very finely punctured, each puncture with a moderately long yellow hair.

Holotype male and two paratype males, Havana, Hale Co., Alabama, V-20-1938, W. B. Jones. The type was presented to me by Mr. H. P. Loding of Mobile, Ala. The paratypes are located in his collection.

The species is named in honor of Doctor Walter B. Jones, Director of the Alabama Museum of Natural History. It is a remarkably distinct and striking species and may be identified without recourse to the genitalia. While possessing a type of genitalia similar to that of **ilicis** (Knoch), there is a distinct perpendicular, somewhat obtuse process on the inside of the right clasper near the middle. The clasper is deeply excavated

laterad of the process. For figures of the genitalia, see Plate I, figures 1 to 3.

Phyllophaga psiloptera n. sp.
Length, 15-16 mm.; width, 8 mm.

The present species is perhaps more closely related to **ignava** (Horn) but is not assignable to any of Horn's groups of the genus.

Form elongate, sub-cylindrical though somewhat wider behind. Color dark reddish-brown. Body above glabrous.

Antennae 10-segmented, the club a little longer than segments two to seven combined. Clypeus slightly though distinctly emarginate with the margins moderately reflexed on each side of middle. Clypeus very densely, irregularly, and somewhat confluently punctured. Front over an area equal to dimensions of clypeus irregularly but not as closely punctured as clypeus, especially on sides. Head behind this area smooth except for a few punctures at sides near eyes. Clypeal suture lightly impressed.

Pronotum with punctures moderately small and irregular, separated from one or two to several times their diameters. A larger central space and lateral spaces nearly smooth. Pronotum very nearly twice as wide as long, the sides in basal half nearly straight though slightly emarginate before the rectangular hind angles. Posterior margin distinctly margined on each side of median one-third to angles. Anterior angles not produced.

Elytra moderately and sub-rugosely punctured. Sutural and sub-sutural costae distinct posteriorly. Elytra gradually wider posteriorly, the widest point at apical one-third.

Pygidium very convex, very coarsely and irregularly punctured. In proportion to the size of the body, the pygidium is smaller than usual in our Phyllophagas. The measurements are: length, 4 mm.; width, 2.5 mm.

Abdomen convex, nearly smooth at middle. Punctures much closer and coarser on sides, each puncture with a small decumbent hair. Penultimate segment declivous posteriorly and with a median, circular, coarsely strigose area. Sides of this segment rather coarsely

punctured, the hairs here longer than those on other abdominal segments. Last segment flat, finely strigose at middle.

Both spurs of hind tibia free, slender. One spur distinctly longer than the first hind tarsal segment, the other about two-thirds the length of the longer spur. Tooth of claw small and nearly basal.

Metasternum rather finely and closely punctured, each puncture with a long yellowish hair.

Holotype male and paratype male, Chisos Mts., Brewster Co., Texas, VII-27-1937, Blue Creek, elevation 6000 feet. The two specimens were collected and presented to the Field Museum of Natural History by B. Hartelius. Through the kindness of its director, Mr. C. C. Gregg, I have been permitted to retain the paratype.

This distinct species is to be placed near the **submucida** and **ignava** Groups of Horn by possessing 10-segmented antennae and free spurs on each posterior tibia. It differs chiefly from **ignava** in its entire margins of pronotum, and from members of the **submucida** Group by not having the upper surface of the body iridescent. The genitalia is quite distinctive, and is figured on Plate I, figures 5 and 6.

The right middle leg of the paratype is monstrous and may be worthy of description. The first tarsal segment is rather suddenly enlarged at the tip with the next segment nearly equal in width. From the second segment on the lower side, the last three segments of a second tarsus arise. These segments are, however, more slender than the normal tarsus, and the terminal segment is without claws.

Phyllophaga clemens (Horn)

Lachnosterna clemens Horn, Trans. Am. Ent. Soc. XIV, 1887, p. 227.

Lachnosterna clemens Horn, (Smith) Proc. U. S. Nat. Mus. XI, 1889, p. 496.

Phyllophaga howei Sanderson, Jr. Ks. Ent. Soc. 10, 1937, p. 17.

In Horn's Revision, this species was described and recorded from Florida and Texas, but without more definite localities. At that time the female was unknown. In Smith's paper on the genus, the genitalia of the species

was figured from a specimen supposedly collected in New Jersey and determined by Horn as **clemens.** As far as I know, these are the only records for the species. In 1937. I described and figured a new species under the name of **howei.** While this paper was in press, I learned through correspondence with Mr. O. L. Cartwright of Clemson College, S. C., and Mr. Mark Robinson of Philadelphia, that **howei** was the same as **clemens** Horn. This synonomy was based upon their examination of specimens from the Horn series. According to Horn, **clemens** falls in the **longitarsa** Group by virtue of its 9-segmented antennae, and the very short fixed spur of the hind tibia. My series had this spur well developed. It seems probable that Horn had misidentified the specimen figured in the Smith paper as **clemens.** The figure of Smith appears much like that of **debilis** (Lec.). My figure of the male of **howei** is the correct one for **clemens.**

I have recently examined three more males and one female of **clemens** from Fairfax, S. C. Two of the males were collected May 26, 1932, one male June 4, 1932, and the female on June 13, 1932. Since the female has heretofore remained unknown, it is here briefly characterized.

Agreeing in all essentials with the male except as follows: the antennal club sub-equal to segments 3-6 combined; abdomen convex, smooth; last abdominal segment with a superficial emargination*, the length of the emargination equal to one-third of the length of the segment. There is a row of large punctures along the margin, each bearing a slender hair. The pygidium is one-fourth wider than long. The female is nearly the same size as the males but with the femora and tibiae somewhat stouter. The last ventral abdominal segment is figured on Plate I, figure 4. Careful dissecting of the female failed to disclose any sclerotized structures which we know exist in our species. They may have been lost. It may be of interest to note that fifteen fully developed eggs were found in this female.

Phyllophaga karlsioei (Linell)

This species was described from Arkansas but without definite locality. I have three males from the state as follows: Hempstead Co., May 6, 1929, L. L. Smith, collected on pecan; Franklin Co., April 15, 1938, M. W. Sanderson, in soil; Fayetteville, 1923. Pecan is the first

host recorded for the adult of the species. The internal sac of the genitalia of the Franklin County specimen was artificially inflated and is figured on Plate II. The shape of the sac is similar to that of **ulkei** (Smith), but in a large series of dissected specimens of the latter species from Georgia, the posterior processes at base are horn-like in shape. Other sclerotized processes through the series of **ulkei** were variable in number and shape. For figures of **karlsioei, ulkei,** and **fervida** (Fab.), see Plate II.

Phyllophaga (Phytalus) **omani** Sand.

1937. Jr. Kans. Ent. Soc., 10, pp. 66-68.

At the time the species was described, I had but the male type from Burnsville, Ala., and the allotype from Prattsburg, Ga. Since then I have received another male from Mr. P. W. Fattig, Emory University, Georgia, labeled: Thomasville, Ga., May 28, 1938, W. H. Thames, Jr. The specimen was collected on crab apple, this being the first recorded host for the species.

Phyllophaga floridana Rob.

1938. Trans. Am. Ent. Soc. LXIV, p. 110.

This species was recently described from St. Petersburg, Florida, from two males and one female. I have examined several additional specimens from Thomasville and Quitman, Georgia, March and April, collected on oak. A single specimen has been seen in the H. P. Loding collection, Gallant, Etowa County, Ala., 1936.

Phyllophaga spreta (Horn)

In Mr. H. P. Loding's collection, there is a single male of this rare species labeled: Monte Sano, Madison Co., Alabama, VI-1933, Museum Expedition. This is a new record for Alabama.

Phyllophaga kentuckiana Ritcher

1937. Ent. News, LXVIII, p. 285.

I have examined two males in the collection of Mr. Loding from Tombigbee R., Sumter Co., Alabama, May. This is a new record for the state.

* In the space behind the emargination there is a thin, less highly sclerotized structure which occupies all of the emargination.

Phyllophaga lobata Fall

Described from one male and three females from Chiricahua Mts., Arizona. I have seen one male and one female from the Santa Rita Mts., Arizona, collected in July and August. Another female is at hand from S. Catalina Mts., Ariz., July. This is believed to be the first record of the species since the original description.

Phyllophaga elizoria Saylor

1906. **Lachnosterna pygidialis** Schffr., Trans. Amer. Ent. Soc., 32, p. 257.

1937. **Phyllophaga elizoria** Saylor, new name, Rev. de Ent., Vol. 7, p. 321.

I have three males of this uncommon species from Melbourne, Florida, Feb. 17, 1938, Robert Kempfer, collected at light. The species is known only from Florida. The female is unknown, and no host plant has been recorded for the species.

Phyllophaga epigaea (Wickh.)

A little known species described from southwestern Texas. About 65 miles south of Marathon, Texas, on July 10, 1938, Dr. R. H. Beamer and Biological Survey party from the University of Kansas secured several hundred specimens of this species. According to Dr. Beamer, the beetles were crawling about during the day over a creosote-bush flat on which their camp was located. Some of them were observed on the plants, others on the ground, and a number were found copulating. This is one of our few truly diurnal Phyllophagas. Dr. Beamer also secured a single male at Alpine, Texas, one of the original localities from which Wickham received his specimens.

Phyllophaga mariana Fall

Described from a single male from Lake Mary, Florida and since unrecorded. I have seen one specimen in the collection of Mr. C. A. Frost collected at Orlando, Florida, March 20, 1929, at light. The middle lobe of the aedeagus shows the same unevenness in the processes that Fall observed in his specimen but which he thought might be a malformation.

Phyllophaga schaefferi Saylor

1909. **Lachnosterna georgiana** Schffr., Bull. Brook. Inst., I, p. 382.

1937. **Phyllophaga schaefferi** Saylor, new name, Rev. de Entomologia, 7, p. 321.

This species was described from a single male collected in Georgia but without definite locality. In the collection of Mr. C. A. Frost, I have seen a male labeled Florida. From Mr. P. W. Fattig of Emory University, Georgia, I have received one male and several females from Thomasville, Ga., collected from March 29, 1938 to April 4, 1938 on oak and sweet gum. So far as I know these are the first host records given for the species.

Phyllophaga longispina (Smith)

Of this uncommon species I have seen a number of specimens from Dillard, Ga., May and June, collected on persimmon, oak, and chestnut. Specimens were kindly sent to me by Mr. Fattig from Emory University, Ga. From Mr. H. P. Loding, I have received several specimens collected by the expedition from the Alabama Museum of Natural History at Mt. Sterling, Haywood Co., North Carolina, and at Smokemont, North Carolina. Mr. C. A. Frost has a male in his collection which was taken at Framingham, Mass., May. In the collection of the American Museum I have seen several specimens from McDowell Co., N. C., May; Black Mts., N. C., June; and Cornwall, Conn., May. The female is easily separated from the female of **hirsuta** (Knoch) by the emarginate last ventral abdominal segment. In **hirsuta,** this segment is produced in a very small projection at the middle. The male of **longispina** has the inner process of the left clasper vertical while in **hirsuta** the same process is sharply curved. The two species look much alike superficially.

Phyllophaga subtonsa (Lec.)

I have examined several specimens in the collection of Mr. P. W. Fattig from Head River, Ga., collected on June 8, 1937, on hickory and white oak. I have also seen the species from Madison, Jackson, and Etowa Counties, Alabama. Horn does not recognize this species as distinct from **ilicis** (Knoch), and Smith does not mention the species. Glasgow considered it as a valid species

but it seems to have been mentioned by little since. The hairs on the pronotum of **subtonsa** are generally more erect than in **ilicis**, and the posterior margin of the right clasper in the males of **subtonsa** is rounded and not deeply emarginate as in **ilicis**. The two are probably confused in collections.

Explanation of Plate I

Fig. 1. **Phyllophaga jonesi** n. sp., right clasper of aedeagus.

Fig. 2. **Phyllophaga jonesi** n. sp., dorsal view of aedeagus.

Fig. 3. **Phyllophaga jonesi** n. sp., left clasper of aedeagus.

Fig. 4. **Phyllophaga clemens** (Horn), last ventral abdominal segment of female.

Fig. 5. **Phyllophaga psiloptera** n. sp., dorsal view of aedeagus.

Fig. 6. **Phyllophaga psiloptera** n. sp., right lateral view of aedeagus.

Fig. 7. **Phyllophaga lodingi** n. sp., right clasper of aedeagus.

Fig. 8. **Phyllophaga lodingi** n. sp., dorsal view of aedeagus.

Fig. 9. **Phyllophaga lodingi** n. sp., left clasper of aedeagus.

Fig. 10. **Phyllophaga lodingi** n. sp., public process of female.

Fig. 11. **Benedictia pilosa** n. gen. and sp., dorsal view of aedeagus.

Fig. 12. **Benedictia pilosa** n. gen. and sp., right lateral view aedeagus.

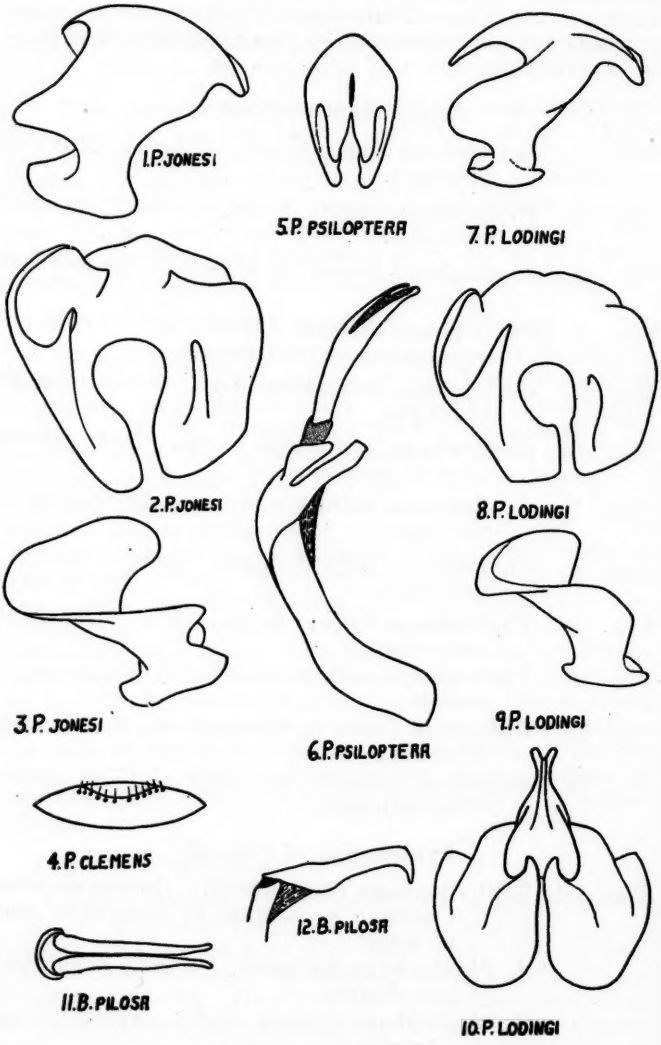
Explanation of Plate II

Figs. 1 to 5. **Phyllophaga ulkei** (Smith), figures showing variation in internal or copulatory sacs of males.

6. **Phyllophaga karlsioei** (Linell), copulatory sac of male.

7. **Phyllophaga fervida** (Fab.), copulatory sac of male.

Plate I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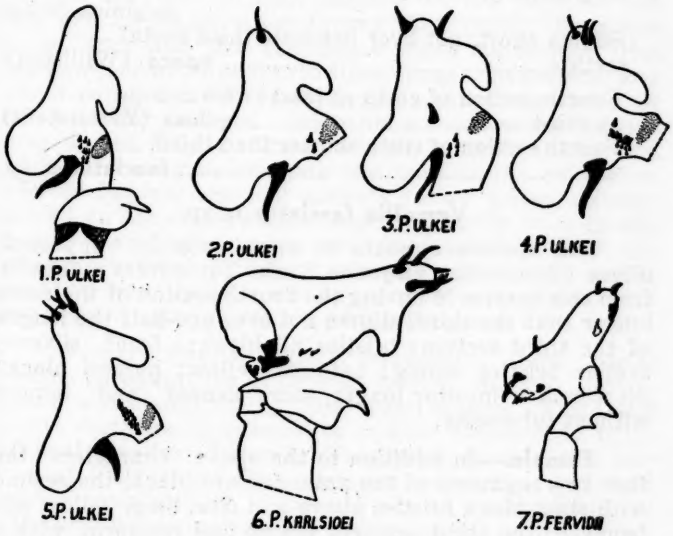
5.P. PSILOPTERA
7.P. LODINGI
2.P. JONESI
8.P. LODINGI
3.P. JONESI
6.P. PSILOPTERA
9.P. LODINGI
4.P. CLEMENS
12.B. PILOSA
11.B. PILOSA
10.P. LODINGI

Plate II


1.P. ULKEI
2.P. ULKEI
3.P. ULKEI
4.P. ULKEI
5.P. ULKEI
6.P. KARLSIOEI
7.P. FERVIDI

NEW NEARCTIC PIPUNCULIDAE (DIPTERA)

D. ELMO HARDY, Lawrence, Kansas*

Key to known Nearctic **Verrallia**

1. Last section of fourth vein appendiculate 2
   Last section of fourth vein normal 3
2. Stigma long, as long as third costal section. .... **virginica** Banks
   Stigma short, not over one-half third costal section .... **opaca** (Williston)
3. Fourth section of costa at least twice as long as third ..... **pilosa** (Zetterstedt)
   Fourth section of costa shorter than third. .... **fasciatus** n. sp.

Verrallia fasciatus n. sp.

This species appears to more closely approach **pilosa** (Zett.) than **virginica** Banks but differs markedly from this species in having the fourth section of the costa longer than the third, stigma not over one-half the length of the third section; bristles all black; front silvery; ocellar bristles strong; halteres yellow; humeri black; piercer of ovipositor longer, more slender and femora without tuberosity.

Female.—In addition to the above characters the first two segments of the antennae are black, the second with stout black bristles above and fine, long, yellow pile beneath; the third segment brown and reniform, with a fringe of yellow white pile (fig. 1b). **Head:** Face and front silvery, this being brought about by the dense covering of silver pubescence. Face convex from lateral view. Front slightly narrowed at the halfway point between antennae and the vertex, the sides not being parallel as in **pilosa.** Occiput chiefly silvery but scarcely visible from side view.

Thorax: Opaque gray, slightly brownish on the posterior half of mesonotum. Pleurae, mentantotum and scutellum, also posterior one-half of each abdominal segment, silvery gray. Bristles of the thorax strong, four pairs on the scutellum; all bristles black except for two to three pairs of notopleurals which are yellow. Dorsum

* Contribution from Department of Entomology, University. of Kansas.

with rather abundant yellow pile. **Legs:** Coxae, trochanters and femora black with gray pollen, extreme tip of femora, tibiae and tarsi yellow, last two tarsal segments brownish. Femora without tubercles or strong bristles, but with numerous rows of long yellow hairs.

Abdomen: Slightly tapering, as viewed from above, widest at segments one and two. First two segments opaque brownish on their anterior halves, segment two one and one-third times longer than third. Segments three, four and five subopaque black anteriorly, fifth segment one and one-fourth times longer than fourth and about equal to sixth; sixth tergite somewhat pointed on its posterior margin. Segments six and seven entirely gray dusted, faintly shining, seventh protruded, long and narrow, serving to elongate the base of the ovipositor. First abdominal segment entirely yellow pilose, densely haired on the sides; second segment chiefly so, with one row of black hairs on the posterior border, hairs of abdomen otherwise black. Ovipositor elongate, gently tapering from the base into a long narrow piercer extending beyond anterior portion of third segment (fig. 1c).

Wings: Hyaline, faintly iridescent; third costal section three-fourths as long as fourth. Stigma brown, almost completely filling third costal section. Third and fourth costal sections equal to or little longer than fifth. Ultimate section of fourth vein slightly sinuate, last section of fifth longer than posterior crossvein. Anal cell with a long petiole. Crossvein r-m at about middle of the third costal section and before middle of discal cell (fig. 1a).

Length: Wing, 5 mm.; body, 4.3 mm.

Male unknown.

Holotype female, Durango, Colorado, July 2, 1937, C. L. Johnston. In the Snow Entomological collection.

Pipunculus atramontensis occidens n. var.

The specimens at hand differ from the original description of the species in having the antennae black (third segment brownish black), the third segment not so long pointed (fig. 2b). The hypopygium is longer than the fifth segment, viewed from the side, and has a flat slightly convex area on its apex, simulating an apical cleft (fig. 2a). This area may or may not be interpreted as a cleft. It is not deeply grooved but is distinct-

ly indented in the center; as viewed from above, however, it would appear to be a cleft. Banks and Cresson[1] made no mention of this character in the description of **atramontensis** and this may prove to be a distinct species. The posterior portion of the abdomen is somewhat more swollen than the type variety as figured by Cresson and the specimens are slightly smaller in size. Length: wing, 4.5-4.7 mm.; body, 3.5-3.7 mm.

The following observations would be added to the original description of the species: Occiput subshining black above, silvery below. Mouthparts bright yellow. Comb of first abdominal segment composed of long grayish yellow hairs; the hypopygium is rather large as compared to other Pipunculidae. Stigma very minute, barely discernible in the apical portion of third costal section. Second costal section of wing less than one-third the length of the fourth section in **atramontensis** Banks, about one-fifth its length in **atramontensis occidens.** Ultimate section of fifth vein shorter than posterior crossvein, last section of fourth vein slightly curved; anal cell with a very short petiole.

Female unknown.

Holotype male, Potlatch, Idaho May 28, 1930 (J. M. Aldrich); paratype male, same data as holotype. Holotype returned to the United States National Museum, paratype retained in the Snow Entomological Collection.

Pipunculus contortus n. sp.

This unusual species remotely resembles **trochanteratus** Malloch in having the posterior trochanter tuberculate but differs greatly from this or any other known previously described species. It is distinguished from all other **pipunculus** in having the post-tibiae and femora strongly contorted (fig. 3d) and the hypopygium densely haired (fig. 3a).

Male.—Head: Face silvery pubescent, front golden (in ungreased specimens). Eyes contiguous for only a short distance on the upper part of the front. Sides of occiput silvery pollinose, upper part and vertex subshining. Third antennal segment short acuminate (fig. 3c), brownish in ground color.

1 Studies in North American Dipterology: Pipunculidae, Tran. Amer. Ent. Soc., Vol. XXXVI, 1911.

Thorax and **abdomen:** Lightly gray pollinose, but slightly shining and covered with very fine, short brownish pubescence. Pleurae, metanotum and sides of abdomen more conspicuously grayed. Humeri and halteres bright yellow. **Legs:** Chiefly black except for extreme apices of femora and tibiae, broad bases of tibiae and first two tarsal segments which are yellow; other tarsal segments brown to black. Femoral spines very weak.

Abdomen: Somewhat rounding, broadest at segments two and three; segment five about one and one-third times as long as four. **Hypopygium:** About one-half as long as fifth segment, densely brown to black haired, only slightly compressed to the right and with a slight apical cleft (fig. 3b).

Wings: Hyaline, without stigma. Third costal section short, about one-third to one-fourth the length of the fourth section (fig. 3e). Crossvein r-m situated at the middle of the discal cell, just beyond the middle of the fourth costal section.

Last section of fourth vein slightly sinuate; ultimate section of fifth vein equal in length to the posterior crossvein. Petiole of anal cell long.

Length: wing, 3.3 mm.; body, 3 mm.

Female unknown.

Holotype male, Douglas Co. Ks. Sept. 30, 1933 (H. M. Smith). Two paratype males, Manhattan, Ks. July 29, 1930 and June 10, 1932 (D. A. Wilbur).

The holotype and one paratype are being returned to Kansas State College; one paratype is retained in the Snow Entomological Collection.

Pipunculus femoratus curvitibiae n. var.

These specimens run to **aequus** Cresson in Cressons key but morphologically are the same as **femoratus** Cresson and no doubt they belong to that species.

This variety differs in having the antennae blackish, tinged with yellowish brown; thorax and abdomen clothed with long rather dense, yellow-gray pile; femora brownish black, yellowed basally and apically. Abdomen opaque to sub-shining brownish pollinose, dusted with gray on the sides and posterior margins of the seg-

ments. The posterior tibiae seem more strongly curved and the femora more spinose (fig. 4a) than is shown in Cressons figure of **femoratus.**

Length: wing, 5.8-6 mm.; body, 5.3 mm.

The following observations might be added to the original description of the species: Comb of first abdominal segment grayish yellow, hypopygium about three-fourths as long as fifth segment, as viewed from above. Third costal section of wing and stigma much shorter than fourth section, not over three-fourths as long; last section of fourth vein strongly sinuate, ultimate section of fifth vein shorter than posterior crossvein. Anal cell with a medium lengthed petiole; r-m crossvein at or but slightly beyond end of auxiliary vein and at basal one-third of discal cell.

Holotype male, Cave Cr. Can., Chiricahua Mts., Ariz. 5500 ft. One paratype, same data as holotype, also one specimen from White Mts., N. M. Rio Ruidosa, Alt. 6500 ft. (Townsend). The latter specimen is not being set up as a paratype but seems to belong here; the abdomen is slightly shining.

The holotype is being returned to the United States National Museum. The paratype deposited in the Snow Entomological Collection.

Pipunculus knowltoni n. sp.

This species runs to **insularis** but is markedly different from this tropical species. The post-trochanter has a very distinctive, narrow ridge on the under portion, densely covered with minute, silvery matted pubescence (fig. 5a) and the hypopygium is much shorter than the fifth segment.

Male.—Head: Front and face silvery, front slightly browned above. Eyes contiguous for about one-third the length of the front. Mouthparts yellow-brown. Antennae black; third segment white pubescent, long acuminate below (fig. 5b). Occiput silvery on the sides, dusted black above.

Thorax and **abdomen:** Subshining to metallic, very faintly cinereous, the gray coloration is produced by microscopic pubescence; the abdomen is sparsely covered with short black hairs. Scutellum shining; metathorax densely gray pollinose; humeri whitish; halteres yellow.

Meso- and propleurae subshining, rest of pleurae cinereous. **Legs:** Chiefly black with only tarsi, apices of femora and bases of tibiae yellow. Front and mid coxae, trochanters, inner sides of all femora shining. Posterior coxae cinereous, strongly flattened. Femoral spines weak, femora not swollen. **Abdomen:** Sides straight or nearly so, not tapering until fifth segment. Lateral comb of first segment composed of several long black hairs. Fifth segment one and one-third as long as fourth. **Hypopygium:** About three-fourths as long as fifth, subhemispherical, not compressed; with a distinct cleft on the right side (fig. 5c). Ventral process black, extending to about third segment.

Wings: Hyaline; third costal section about one-half the length of fourth; r-m crossvein situated beyond end of first vein and middle of discal cell. Ultimate section of fourth vein slightly curved but not sinuate, last section of fifth about as long as post-crossvein. Petiole of anal cell of medium length.

Length: body, 3mm.; wing 3.3 mm.

Female.—The female approaches **albiseta** Cresson but differs in having shorter ovipositor, with a distinct tubercle at the base (fig. 5d). This tubercle is more strongly developed on some specimens and the ovipositor seems to vary in length. Front silvery to the vertex, otherwise like the male.

Holotype male, Cache Junction, Utah, August 23, 1938 (G. F. Knowlton and D. E. Hardy). Allotype female, Manhattan, Kansas, September 14, 1933 (D. A. Wilbur). Paratypes, thirty-two males and twenty one females, same locality and collector as allotype, collected from June 30 to September 28, 1930 to 1937; one male, same locality, 5 Sept. 31 (H. M. Smith); one male, same locality, October 8, 1929 (T. F. Winburn). One male, Harker Co., Oklahoma July 23, 1933 (R. H. Painter); male, Page, Oklahoma, June 23, 1937 (Standish-Kaiser) and two males, Stillwater, Oklahoma, Sept. 10, 1938 (R. W. Kaiser). One female, Trout Creek, Utah, Sept. 18, 1938, Meadow sweeps (G. F. Knowlton and F. C. Harmston); one female, Johnson, Utah, Sept. 12, 1938, Meadow sweeps (G. F. Knowlton and F. C. Harmston); one female, Franklin Co., Kansas, June 8, 1923. (R. H. Beamer) and one female, Spearville, Kansas, September 7, 1938 (D. E. Hardy and A. T. Hardy).

This species was originally described, in manuscript, from the holotype male. A large series of these were later found in the Kansas State College collection and have been incorporated in this description. It has been named in honor of Dr. G. F. Knowlton who with the writer collected the holotype and under whose direction this study was begun.

The holotype and a number of paratypes are being deposited in the United States National Museum. The allotype and a share of the paratypes at Kansas State College; the remainder of paratypes at Utah State Agricultural College, Oklahoma A & M College and the Snow Entomological Collection.

Pipunculus wilburi n. sp.

This species approaches **P. trochanteratus** Malloch but differs in having a conspicuous long apical spur on the mid-coxae (fig. 6c) and long tooth on post-coxae of the male.

Male.—Head: Eyes contiguous for one-third to one-half the length of the front; face and frontal triangle silvery. Occiput gray on the sides, subshining above. First two antennal segments black, third segment brown with gray pruinosity and whitish fringe; third segment short acuminate, style not greatly thickened basally (fig. 6b).

Thorax and **abdomen:** sub-shining, very lightly dusted with gray, the dust being more perceptible on the sides and apices of abdominal segments and on the pleurae of thorax; metanotum more grayed. **Legs:** Black, except for narrow apices of femora and tibiae, broad bases of tibiae and first four tarsal segments which are yellow; fifth tarsal segment, brownish. Front femora with two small flexor hairs near their bases on the under side. Spur of mid-coxae about one-half the length of the segment, and about equal to the trochanter in length. Tooth of posterior trochanter tapering (fig. 6d). Femoral spines weak, only slightly developed on apical one-third of segment. Dorsum of thorax and humeri with scattered black hairs, humeri whitish yellow. Knobs of halteres yellow, bases dark.

Sides of abdomen somewhat straight, gradually tapering posteriorly, widest at segments two and three.

Hypopygium: compressed to right, elongate and slightly pointed apically; cleft on the right side and with a large apical keel.

Wings: Hyaline, slightly fumed; third costal section approximately one-third the length of fourth; third and fourth section two-thirds as long as fifth. Stigma absent; r-m crossvein situated beyond middle of fourth costal section and at the middle of the discal cell.

Length: wing, 3.4 mm.; body, 3.1 mm.

Female.—

Front silvery to the vertex, slightly concave in the middle. Front and mid-femora with two to three stout black hairs on the under side near bases; post-trochanter with a small clump of short, black hairs beneath. Piercer of ovipositor slender, reaching past posterior margin of second segment, gradually tapering from its globose base (fig. 6a).

Holotype male, Manhattan, Kansas, Oct. 6, 1933 (D. A. Wilbur). Allotype female, same locality and collector, May 12, 1933. Paratypes, seven males and five females, same locality and collector, collected from July to September, 1930 to 1937; and one female, Riley Co., Ks., April 30, (F. Marlatt). The holotype, allotype and a series of paratypes are being returned to Kansas State College; the rest retained in the Snow Entomological collection.

The species is named in honor of Professor D. A. Wilbur, who collected this series of specimens as well as the majority of specimens of **knowltoni** and **contortus.** These were taken in association with their Homopterous hosts in grass plots.

Explanation of Plate

Fig. 1 **Verrallia fasciatus** n. sp.
a. wing; b. head; c. lateral view of abdomen.

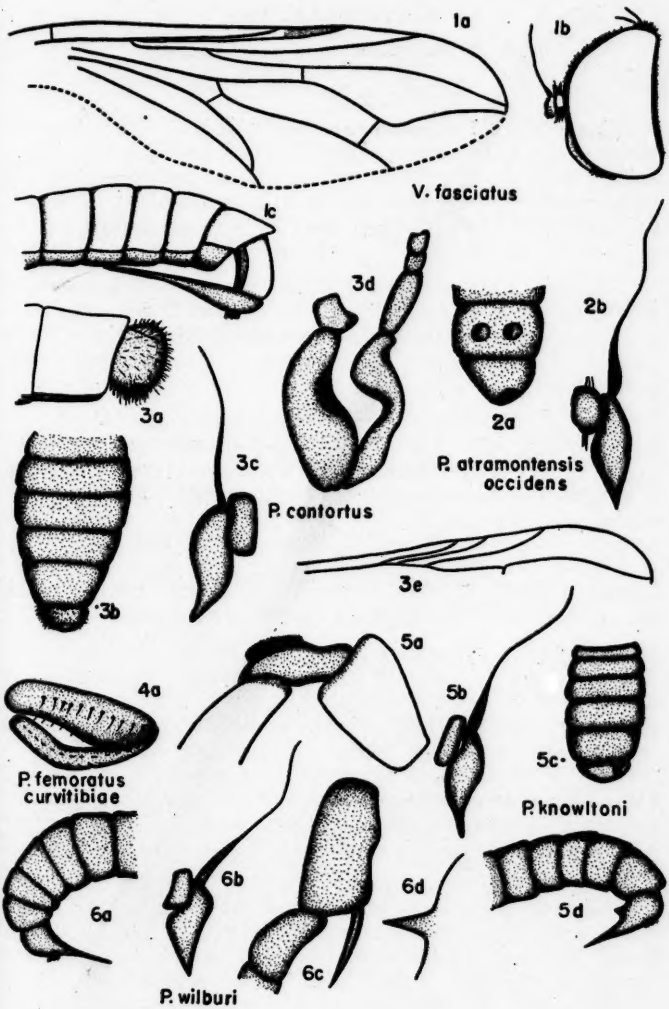
Fig. 2 **Pipunculus atramontensis occidens** n. var.
a. posterior portion of male abdomen, dorsal view; b. antenna.

Fig. 3. **Pipunculus contortus** n. sp.
a. posterior portion of male abdomen, lateral view; b. male abdomen, dorsal view; c. antenna; d. posterior trochanter, femur and tibia of male; e. costal section of wing.

Fig. 4 **Pipunculus femoratus curvitibiae** n. var.
a. posterior femur and tibia.

Fig. 5 **Pipunculus knowltoni** n. sp.
a. posterior trochanter and coxa of male; b. antenna; c. abdomen of male, dorsal; d. female abdomen, lateral view.

Fig. 6 **Pipunculus wilburi** n. sp.
a. abdomen of female, lateral view; b. antenna; c. mid-coxa and trochanter of male; d. outline of posterior trochanteral tooth, male.


1a
1b
V. fasciatus
1c
3d
2b
3a
2a
3c
P. atramontensis occidens
P. contortus
3b
3e
5a
4a
5b
5c
P. femoratus curvitibiae
P. knowltoni
6a
6b
6d
5d
6c
P. wilburi

FOUR NEW SPECIES OF LEAFHOPPERS AND NOTES ON TWO OTHERS (HOMOPTERA, CICADELLIDAE)

R. H. BEAMER, Lawrence, Kansas*

Lonatura rotunda n. sp

Resmbling **Lonatura salsura** Ball, but with elytra of short winged form with apices round instead of truncate, color markings usually pronounced, aedeagus of male longer, with bifurcation of tip much narrower. Length: short winged form, 3.50-4 mm; long winged form, 4.50-4.75 mm.

Vertex rounded, not quite so sharp as in **L. salsura.** Elytra in short winged form having last three segments of abdomen exposed; apices rounded; hind wings mere pads; wings longer than abdomen in long winged form, both well developed.

Color. Ground color buff to whitish hyaline, marked with fuscous. Vertex with two black spots on front margin, mesal one more or less triangular; back of these a transverse dash enlarged at either end and a pair of converging dashes basally. Pronotum usually with four distinct longitudinal stripes, often quite dark in long winged forms. Scutellum usually with apex and basal angles darker. Elytra subhyaline, veins white with usually some darker areas, especially on clavus.

Genitalia. Last ventral segment of female about twice as long as preceding, lateral margin excavated for about half its length exposing underlying membrane, posterior margin slightly produced at middle. Male valve short, rounded. plates wider than valve at base, rapidly narrowed to sharp apices; aedeagus in lateral view broad, bent dorsally on outer third with slight indentation of margin at that point; apex in ventral view with narrow mesal slit about two-thirds as long as greatest width of shaft.

Holotype male, allotype female, 15 male and 18 female paratypes, Swan River, Manitoba, August 2, 1937, R. H. Beamer; 4 female and 8 male paratypes, Cowan, Manitoba, August 7, 1937, R. H. Beamer. (All short winged); 3 female and 3 male long winged forms, same

* Contribution from the Department of Entomology; University of Kansas.

data as latter; 1 long winged female, Birch River, Manitoba, August 3, 1937, R. H. Beamer.

Twiningia tricolor n. sp.

Resembling **T. bicolor** (Ball) but dorsum crossbanded with three colors, white, fuscous, and orange. Lengtn; female 4 mm.; male 5 mm.

Vertex deeply excavated, margins very sharp. Elytra longer than abdomen, apices rounded, with two claval veins, outer indistinct, two cross-nervures and appendix.

Color. White with following crossbands: mottled fuscous occupying pronotum, scutellum and bases of elytra, golden yellow from about middle of clavus almost to cross veins and fuscous from cross veins to apices. White basal color shows as narrow band on both sides of yellow band. Apical cells usually with a light areole in base. Venter golden yellow except fuscous cross band of pronotum which occupies a portion of face and all of sternum, including legs to tibiae.

Genitalia. Last ventral segment of female about three times as long as preceding; posterior margin roundingly produced, sharply excavated one-half its length either side of long ribbon-like process which in turn has a sharp V-shaped notch in apex one-third its length. Male valve longer than preceding, angular; plates about as wide at base as valve, outer margin arcuately narrowed to very sharp apices, extending beyond pygofers. Pygofer almost rectangular in shape, with rather blunt tooth on outer ventral corner; aedeagus in ventral view narrow, but with a broad appearance due to a process on each side that is wider than aedeagal shaft, curves with and extends one-fourth its length beyond its apex; in lateral view widest at base, curving dorsally, to form semicircle, margins converging to very slender, sharp apices.

Holotype male, allotype female, 4 male and 12 female paratypes, Anza, California, July 29, 1938, R. H. Beamer; 4 male and 8 female paratypes, Idyllwild, California same date and collector. These specimens were swept from **Arctostaphylos pungens** H. B. K.

Brazosa sexpunctata n. sp.

Resembling **amazonensis** (Osb.) but pronotum not minutely punctate, elytral veins distinct, not marked

with fuscous, but two transverse spots on vertex, none on scutellum. Length: male, 5 mm.; female, 6 mm.

Vertex very slightly wider at middle than next eyes, slightly more than three times as wide as long, convex, strongly rounding from base to front. Elytra with one crossnervure, longer than abdomen with rounded apices.

Color tawny with usually a small pair of black spots on the front, another on the vertex and a third pair on the pronotum. One specimen in the five has an indication of a pair of median, longitudinal, orange red stripes, united at apex, separating and crossing vertex, pronotum and scutellum and another broader stripe back of each eye. Elytra semihyaline, veins more tawny.

Genitalia. Last ventral segment of female more than twice as long as preceding, posterior margin truncate with very small median notch. Male valve very small, sharply angular; plates much wider at base than valve, long, outer margin converging to long, sharp apices, inner margins slightly diverging on outer third.

Holotype male, allotype female and 3 female paratypes, Brownsville, Texas, August 8, 1937, D. J. and J. N. Knull.

Deltocephalus luteoapicalis Beamer

Deltocephalus luteoapicalis Beamer, R. H. Jour. Kans. Ent. Soc., July, 1938, p. 81.

Male like the female but smaller and the elytra longer than the abdomen. Length: male, 2.5 mm.

Genitalia. Valve about one-third longer than preceding segment, angular; plates wider at base than valve, narrowed on outer margin to rather sharp, rounded apices; aedeagus in lateral view very wide at base, rapidly narrowing near middle to one-fourth basal width, bending dorsally at right angles at this point, narrowing on to apex where it is flattened slightly and bent basally. Pygofer more or less rectangular with a fairly large tooth on the outer dorsal corner; margins minutely serrate from tooth to ventral margin.

Allotype male, 13 parallotypes and 20 females, Peeler, Texas, June 22, 1938, R. H. Beamer.

Dicyphonia minuta Beamer

Dicyphonia minuta Beamer, R. H., Jour. Kans. Ent. Soc., p. 70, 1936.

Female resembling **D. plana,** but vertex distinctly wider than long and disc more highly arched on basal half. Length 5.5 mm.

Vertex distinctly wider than length between eyes, disc highly arched on basal half, margins evenly curved from eye to apex, almost foliaceous. Elytra short, exposing four abdominal segments; cut off near apex of clavus, apices slightly rounded; venation fairly distinct although somewhat obscured by vermiculate marks.

Color cinereous with fuscous marks about as in **D. plana.**

Genitalia. Ovipositor projecting; last ventral segment about three times as long as preceding, posterior margin truncate with small median tooth.

Allotype female, Laramie, Wyoming, July 13, 1937, R. H. Beamer. Parallotypes numerous specimens same time and place, R. H. Beamer, C. L. Johnston, and H. T. Peters.

It was only by getting down in the grass and brushing and parting it with our hands that we were able to find the females. These were collected at the type locality, about five miles north of the city of Laramie, Wyoming, on the west side of the road.

Erythroneura extima n. sp.

Resembling **nitida** Beamer, but abdomen light; anterior point of style much longer, posterior point much shorter and processes on shaft of aedeagus on sides about one-fourth distance from apex, very short.

Ground color white tinged with yellow on head, pronotum and scutellum. Vertex with inverted orange V, usually touching eyes, continued across pronotum as two diverging vittae; scutellum with basal angles yellow. Elytra with inner pair of oblique vittae, usually bright red, costal pair lemon yellow; sometimes a slight infuscation in region of cross-veins. Abdomen light.

Genitalia. Style with slender foot, base slightly excavated; anterior point long and heavy, longer than width of foot next points; posterior point short, not over one-third as long as anterior, both points directed obliquely to foot; heel usually small. Aedeagus in lateral view slightly curved dorsally, amost parallel-sided with a pair

of short, lateral processes about one-fourth distance from tip.

Holotype male, allotype female, two male and 5 female paratypes, Cedar River, Michigan, August 26, 1937, R. H. Beamer.

DISTRIBUTION OF THE VEGETABLE WEEVIL IN ARKANSAS

DWIGHT ISELY
University of Arkansas, Fayetteville

The vegetable weevil (**Listroderes obliquus** Klug.) has been known as a pest of various truck crops in Arkansas since 1936, and now apears to be widely distributed over the state. It was first noted in the state because of local injury in Bradley county in southeastern Arkansas, early in May, 1936[1]. A number of other records of local destructiveness were secured from nearby counties, Drew, Ashley, and Chicot, also in southeastern Arkansas. In 1937 the species was abundant enough to cause damage as far west as Hot Spring county[1] in the central part of the state and as far north along the eastern border as Crittenden county within 60 miles of the Missouri line. Also a single specimen was collected June 14, 1937, at Fayetteville in Washington county in the northwestern part of the state. In 1938, between March 25 and May 31, four additional specimens were collected at a trap light by M. W. Sanderson at Fayetteville[2]. No injury by this pest has been observed in northwestern Arkansas. All reports of injury have been received by the Department of Entomology during the month of May.

Up to the present time most of the records of injury by the vegetable weevil have come from the southeastern part of the state, which is nearest to southern Mississippi where it was first observed in the United States in 1922 The infestation at Fayetteville is still in the stage where only isolated specimens are taken. Owing to the scattered distribution of records secured it may be expected that the species occurs rather generally over the state. It is probable that its spread over Arkansas is not as rapid as these records might suggest, but that the insect was established in the southeastern part of the state some years before it became abundant enough to cause injury.

1 Specimens determined by L. L. Buchanan.
2 Specimen determined by L. S. Henderson.

UBER ENTOMOLOGISCHE SAMMLUNGEN—

WALTHER HORN

Students interested in insect taxonomy will be pleased to know that Doctor Walther Horn has completed his "Uber entomologische Sammlungen." This splendid work is indispensable to those interested in the location of types and collections.

The addition of 26 plates giving the reproduction of determination labels in the handwriting of workers past and present is most useful in judging the authenticity of determinations and historic material. The list of workers is arranged alphabetically and is followed by a Nachtrag of 75 pages giving additional names. This valuable work appeared as follows:

Part I **Entomologische Beihefte aus Berlin-Dahlem.** Band 2, pp. 1-160 plus 16 plates contains A to Lull (Dec. 14, 1935)

Part II **Ibid**
Band 3, pp. 161-296 plus 10 plates contains Luet to Waterhouse. (Oct. 4, 1936)

Part III **Ibid**
Band 4, pp. 297-388. Waters to Zivick and supplementary list. (Aug. 1, 1937).

H. B. HUNGERFORD

NOTICE

The Fifteenth Annual Meeting of the Kansas Entomological Society will be held April 1, 1939, at the University of Kansas, Lawrence, Kansas.

Members wishing to present papers should submit titles to the Secretary not later than March 1, 1939.

H. H. Walkden, Secretary-Treasurer
1204 Fremont St.,
Manhattan, Kansas.

STUDIES IN NEOTROPICAL STRATIOMYIDAE (DIPTERA)

MAURICE T. JAMES
Colorado State College

The following paper presents studies, in the form of short reviews, of three genera of Stratiomyidae which are found chiefly or exclusively in the Neotropical Region. For the material studied, I am indebted to many individuals and institutions, but especially to the American Museum of Natural History, the Museum of Comparative Zoology, the University of Kansas, the Deutsche Entomologische Institut, Doctor S. W. Frost, Doctor J. Bequaert, Doctor M. Bequaert of Gand, Belgium, and Doctor John Lane of the Sao Paulo Museum, Brazil.

I The American Species Formerly Referred To Chrysochlora Latreille.

The genus **Chrysochlora** was established in Cuvier's Regne Animal (1829), by Latreille, for **Sargus amethystinus** Fabr., from Mauritius, the only species mentioned. Enderlein has no authority, so far as I can determine, for considering **Sargus vespertilio** Fabr. the type.

Williston (Biologia Centr. Amer., Dipt., 242) has questioned the generic position of the American species which have been referred to this genus, on the basis of the metallic coloration of **amethystina** and the statement of Macquart that the eyes of the males are contiguous. An examination of the genotype shows that this query was well-founded. **C. amethystina,** male, has a short antennal flagellum, which, excluding the arista, is slightly shorter than the combined length of the first and second segments: structurally, however, it is as in the American species: the eyes are broadly contiguous; the scutellum is triangular (not much different, however, from that of **frosti** described below); vein R2+3 arises beyond cross-vein r-m by a distance much greater than the length of the cross-vein; the part of the discal bordering the fifth posterior cell is by far shorter than that bordering either the second, third, or fourth posterior cell; the discal cell, therefore, tends to be more acute apically; and the body is predominantly metallic. In respect to these characters, it seems that **amethystina** may stand alone. According to Miss Ricardo's descriptions (Insects of Samoa, Dipt. 113-115) and Terzi's excellent illustrations, **C. luteipes** Ric. and **C. insularis** Ric. are like the American species

except for a somewhat metallic coloration. (Miss Ricardo described, however, only the females). I do not know the other Old World species, **C. lineata** de Meij., but it is probably also like the American ones.

These considerations force the following issue: whether to propose a new generic name for the American species, or to leave the heterogenous combination as it now stands. Either course offers serious objections. On the one hand, it is undesirable to change a well-known generic name that has for more than a century been applied to a group of species, and leave that name restricted to a single one; the other course would, however, if carried to its logical conclusion, demand the union with **Chrysochlora** of such genera as **Chromatopoda** and **Cacosis,** which, though possessing good generic characters, are no more distinct from **C. amethystina** than that species is from **C.vespertilio** and its allied species.

I am therefore proposing the following generic name for the American species.

Chrysochlorina James, gen. nov.

Antennae elongated, longer in the female than in the male, the flagellum elongated-conical and ending in a long, bare bristle. Eyes bare, broadly separated in both sexes. Scutelleum unspined, usually rounded, sometimes almost triangular. Venation strong, the posterior veins reaching almost or quite to the posterior margin; vein R2+3 interstitial with cross-vein r-m, or almost so; sides of the third posterior cell almost parallel; the fifth posterior broadly contiguous with the discal cell, the extent of the contact being at least as broad as that of the second, and usually that of the third and fourth, posterior cells. Abdomen at least as broad as, usually broader than, the thorax. Large, usually predominantly yellowish or greenish, sometimes black or metallic, flies.

Genotype, **Chrysochlorina (Sargus) vespertilio** (Fabricius) 1805.

Key to species.

The following key, adapted, with modifications, from that of Curran (Amer. Mus. Nov., 339, p. 2, 1929), contains the described Neotropical species.

1. Front with black vitta or largely black 2
   Front yellow, at most the ocellar triangle brown....10
2. Face yellowish, at least in part 3
   Face blue or green 9

3. Mesonotum vittate 4
   Mesonotum not vittate 8
4. Scutellum yellowish, the base black 5
   Scutellum black, the apex broadly yellowish (Cuba) ..... **quadrilineata** (Bigot)
5. Second abdominal segment without a median pale vitta 6
   Second segment with a median pale vitta (Brazil) ..... **pluricolor** (Bigot)
6. Wings with a dark cloud at the middle and one near the apex (Brazil) ..... **willistoni** (Curran)
   Wings evenly clouded on the apical half, at least in front 7
7. Costal border evenly brown; the abdominal segments with transverse black bands (Guiana) ..... **castanea** (Macquart)
   Costal border not noticeably darker than the apical half of the wing; abdominal segments each with a median black spot (Colombia) ..... **femoralis** (Curran)
8. Thorax and abdomen almost wholly shining black (Panama, Colombia) .... **frosti** James, n. sp.
   Thorax and abdomen not shining black (Galapagos) ..... **fasciata** (Thomson)
9. Front with two yellow spots anteriorly (Venezula) ..... **maculiventris** (Rondani)
   Front wholly metallic (Mexico) ..... **purpurea** (Walker)
10. Pleura and pectus wholly yellow 11
    Pleura and pectus in part brownish or black 12
11. Thoracic stripes black, black-pilose behind the suture (Brazil) ..... **incompleta** (Curran)
    Thoracic stripes reddish brown, yellow pilose (Yucatan) ..... **flavescens** (James)
12. Pectus in part black 13
    Pectus wholly pale, scarcely darker than the pleura (Guiana, Colombia, Bolivia) ..... **varia** (Curran)
13. Costal border of wings broadly and evenly brown (Brazil) ..... **similis** (Macquart)
    Costal border luteous or not evenly brown 14
14. Wings with a median and apical brown spot on the anterior half (Brazil) ..... **vespertilio** (Fabricius)
    Wings evenly luteous in front 15

15. Posterior tibiae and tarsi white, the legs yellow, the color strongly contrasting (Brazil) ..... **albipes** James, n. sp.
Legs yellow, sometimes in part darkened (Mexico) ..... **pulchra** (Williston)

Chrysochlorina frosti James, new species

Male. Eyes, at narrowest point (vertex) separated by a distance of about two and one-half times the diameter of the ocellar triangle; sides of vertex and of the upper part of the front almost parallel, the lower part of the front and the face becoming gradually broader. Front, below the ocellar triangle, with a tubercle, which is sharply margined laterally. Vertex and upper part of front deep black; the lower part of the front and the face dirty yellow; the median vitta of the front brownish, however, to its lower third, this area with numerous fine, irregularly arranged, striae. Face brownish below; cheeks black. Occiput black, except just behind the ocellar triangle, where it is green or yellow. Proboscis bright yellow. First and second antennal segments a dirty yellow; the flagellum and arista black. Head, including antennae, with black pile. Thorax black, black-pilose; the humeri and four small spots, two at the anterior margin of the mesonotum and one on each side before the suture, green; the posterior margin of the scutellum green; the post-alar calluses and sometimes parts of the metapleura slightly greenish. Scutellum terminating in somewhat of a tubercle. Femora black, with black pile; the anterior femora yellowish on the apical third or half, but the pale area gradually merging into the black; tibiae and tarsi light yellow, with concolorous pile. Wings ochraceous along the costal third, brown at the apex and on the posterior third, pale yellow in the middle; veins yellow, except that they become brown in the regions of the brown membrance; venation typical. Halteres green. Abdomen black, wholly black-haired; a small, semi-circular, greenish spot on the first segment; sometimes the lateral margins and the anterior corners very briefly greenish or yellow; in some specimens, a pair of large yellowish spots on the second segment; venter black, black-haired. Genitalia bright yellow, black-haired. Length, 15-18 mm.

Holotype: male. Barro Colorado Island, C. Z., Jan. 5, 1929 (C. H. Curran). In the American Museum of Natural History.

Paratopotypes: 4 males, Barro Colorado Island, Dec. 15, 1936, April 19, 1937, and May 5, 1937 (S. W. Frost).

Paratype: male, Muzo, Dept. Boyaca, Colombia, 900 meters, 1936 (J. Bequaert).

The characteristic tubercle of the front is a structure which, to my knowledge, does not occur in any other member of the genus. This species bears a curious resemblance to **Hermetia pterocausta** O. S.

Chrysochlorina albipes James, n. sp.

Male. Front and face of equal width, the sides parallel. Head entirely yellow, with moderately abundant blackish pile; the pile just above the antennae, however, is bright yellow, and that of the face has some yellow intermixed; the pile of the front and vertex mostly near the ocular margins, the median stripe being practically bare. First two antennal segments subequal, black-haired; the third segment missing in the type. Thorax yellow; the dorsum with three broad, brown stripes; the median one expands and becomes blackish in front of the scutellum; the lateral ones are narrowly separated from the scutellum, and slightly interrupted at the suture; a brownish spot on the dorsum in front of each wing base. Scutellum brownish at the base. Pleura on each side with a black spot at the middle of the notopleural suture and another above the middle coxa. Pectus brown. Pile of thorax yellow; there is some black, however, on the dorsum, especially posteriorly, and on the basal part of the scutellum. Legs chiefly yellow; the hind coxae, however, are brown, and the hind tibiae and tarsi white. Wings yellowish hyaline, the color heavier toward the costal margin; a spot anterior to the discal cell and the wing apex slightly brown, although the clouding is by no means distinct. Abdomen yellowish on the first three segments, reddish brown on the fourth, and distinctly brown at the apex; a large, indefinitely outlined triangle on each side of the second to fourth segments, at the base, brownish; venter yellow; the third, fourth, and fifth segments brownish in the middle. Length, 12 mm.

Holotype, male, Goyas, Brazil, June, 1938.

(Concluded in Vol. 12, No. 2.)

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